



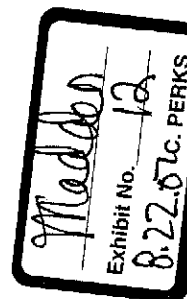
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EXHIBIT 2

OXYGENATE STRATEGY REVIEW

May 19, 1995

- Oxygenate Use Overview
- Health Effects
- Groundwater concerns
- Fuel Performance Issues



EXXON PROPRIETARY

CONFIDENTIAL: This document is subject to the September 21, 1999 Stipulated Protective Order entered by the San Francisco Superior Court, Case No. 999128.

XOM-MT01732-001686

EX1 011225

BACKGROUND OF OXYGENATE USE

MTBE has been used for octane enhancement since the late 1970s; Ethanol is also widely used in gasoline

Annual Average Oxygenate Component Use (kB/D)

<u>Year</u>	<u>MTBE</u>	<u>Ethanol</u>	<u>TAME</u>	<u>ETBE</u>
'94	139	79	9	1
'95 (Est.)	208	75	18	3

EPA Clean Air Act "substantially similar" waiver allows up to 2.7 wt% ethers and 3.5 wt% ethanol

The 1990 CAA Amendments added two provisions requiring oxygenate use

- In 38 carbon monoxide nonattainment areas, fuel containing 2.7% oxygen is mandated for wintertime use *42 originally, 28 Met CO req't, declassification. Can apply for*
- + Engine data showed lower CO when oxygen is added to the fuel; 2.7% requirement was a political compromise *15% vol % max*
- + Nearly three-fourths of the areas have reached attainment; anticipate that the number of CO nonattainment areas will continue to drop

- In nine areas of severe ozone nonattainment, reformulated gasoline containing 2.0% oxygen was required for year-round use

- + Oxygenate does provide octane benefits and marginal help in meeting other RFG requirements *e.g. toxics.*

.12 ppm - offset

BACKGROUND OF OXYGENATE USE (CONT'D)

Oxygenated gasolines account for about 35% of 1995 estimated demand

ANNUAL AVERAGE GASOLINE USE (kBD)

	Conventional	RFG	
	With O ₂	With 2.7% O ₂	With 2.0% O ₂
'94	6600	1000	--
'95	5000	400	600
			1700

EUSA Strategy

- Oppose any use-bans; emphasize importance of flexibility to use oxygenates
- Do not oppose wintertime oxygenate program at 2.0% for CO nonattainment areas

2.7 → 2.0% (winter)

HEALTH EFFECTS OF OXYGENATES

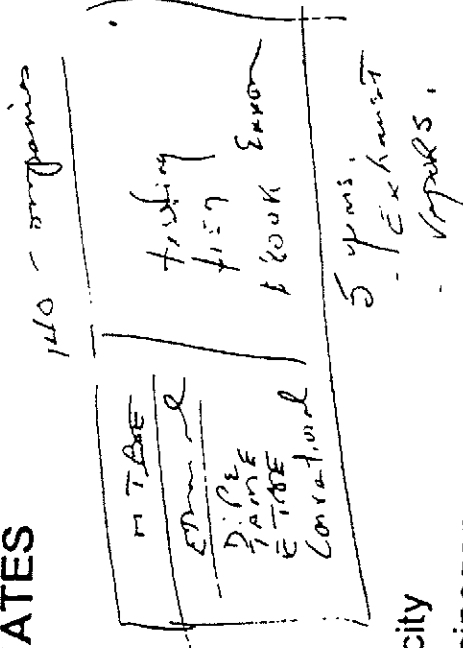
- MTBE is the most extensively tested oxygenate
- Limited data is available on other oxygenates
- Ethanol oral exposure data exists
- Other ethers expected to have similar effects to MTBE

Extensive MTBE inhalation testing generally found low toxicity

- EPA currently classifies MTBE as a possible human carcinogen
- An oral study in Italy found unexpected results--leukemia, etc.
 - + Received much press coverage and support from MTBE opponents
 - + Since study has not been peer reviewed, scientific community has been reluctant to accept its conclusions
- Oxygenated Fuels Association (OFA) planning 2M\$ program to resolve remaining chronic effects questions
 - + Relevance of kidney tumors to humans
 - + Significance of mouse liver and testicular tumors

EPA is seeking additional chronic effects testing

- Ethanol, MTBE, TAME, ETBE, DIPE, TBA in fuel will be tested as part of CAA 211(b) exhaust and evaporative emissions testing requirements
- Consortium formed at API to conduct limited TAME testing (\$2M) under negotiated consent agreement. During negotiations, EPA agreed carcinogenicity study not needed. EPA now indicating that they may require this study. API views EPA's desire as "box checking"



HEALTH EFFECTS OF OXYGENATES (CONT'D)

- While EPA is planning a TSCA test rule for ETBE, plans for testing other oxygenates are uncertain

Complaints associated with MTBE have been related to effects, such as headaches, dizziness, nausea, not addressed in animal studies

- Exposures of employees and consumers to the oxygenates are generally low
 - + API has a fairly good data base on MTBE exposures with conventional fuel and oxygenated fuel; data is limited for RFG
 - + The data on the other oxygenates is limited due to their low use
 - + Exposures frequently above the odor thresholds for the oxygenates
- Controlled human exposure studies have been conducted on MTBE at low concentrations
 - + Generally found no acute effects
 - + Study population limited to young, healthy volunteers; may not be representative of sensitive subpopulations
 - + EPA considering conducting additional chamber studies of MTBE at various operating conditions
 - + Studies of other oxygenates are unlikely due to lack of toxicity data
- EPA is developing a plan for an epidemiology study of communities using MTBE/oxygenated fuel; API has provided some input to the design but thus far is unwilling to participate further.

HEALTH EFFECTS OF OXYGENATES (CONT'D)

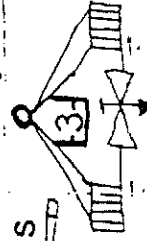
OFA (led by ARCO Chemicals) continues to be willing to conduct studies necessary to defend MTBE

- Both API and OFA consider oxygenates safe at the exposures the public and employees see
- API is working with OFA to ensure a coordinated public response on carcinogenicity questions but maintains resolution is manufacturers' responsibility
- API may conduct additional exposure studies on oxygenated fuels as part of their product stewardship program

EUSA Strategy

- Continue to support API/OFA in dealing with the public
- Support additional human chamber studies to determine whether sensitive subpopulations exist and whether odor or other biological effects are cause of complaints
- Consider participation in necessary studies to understand the risks of exposure to oxygenates that we manufacture, consistent with our Toxics Ethics policy. This includes:
 - + Resolving MTBE carcinogenicity questions via participation in OFA study.
 - + Continuing participation in TAME testing consortium.
 - + Review existing employee exposure data and conduct additional exposure assessments if appropriate.

- Resist participation in studies that are merely "box checking" exercises for EPA, such as the TAME carcinogenicity studies



GROUNDWATER ISSUES WITH OXYGENATES

US Geological Service recently released report identifying MTBE as the second most common groundwater contaminant in their recent study

- 23 of 29 wells in the Denver area had some level of MTBE
- MTBE also found in snow pack

Questions raised by USGS report

- What is the source of MTBE in groundwater?
- What is the source of MTBE in snowpack?
- Does this data raise new health concerns?

Little data available on extent of other oxygenates in groundwater

Natural degradation of ethers in groundwater is slow

- Typical groundwater treatment is currently air stripping
- Enhanced biodegradation may be feasible

EUSA strategy

- Continue to monitor data on MTBE in groundwater
- Seek API review of existing documentation on fate and effects of MTBE in the environment

FUEL PERFORMANCE ISSUES

- Recent consumer concerns about excessive fuel economy loss (up to 20%) and small engine performance have been resolved
 - Recent independent fleet measurements by API and EPA confirm 2-4% loss in economy; equal to predicted value
 - Operating small engines at full throttle may increase operating temperatures
 - ECA Paramins chain saw tests with MTBE fuel identified no problems. Ethanol blends had some increased tendency for phase separation in two-cycle engines
 - Portable Power Equipment Manufacturers Association recent press releases in Wisconsin support RFG as an acceptable fuel
- Materials compatibility questions for the most part have been or can be resolved
 - Claims by Nissan indicated that there may be fuel injector component problems in older vehicles with high mileage attributable to MTBE
 - Chevron indicated that there were possible materials problems with the use of RFG
 - Use of MTBE in gasoline for approximately ten years and at high concentrations (around 2%) for about five years have not led to any significant findings to support any claims. *10% MTBE proven - written 10*
 - API surveyed member companies to identify experience with elastomers and polymers used in pipelines and terminals with oxy fuels
 - Exhaustive review of available materials compatibility data by EUSAVERE does not indicate any product stewardship concerns that need to be addressed
- EUSAVERE will continue to monitor developments in this area